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SCIENCE NEWS LETTER

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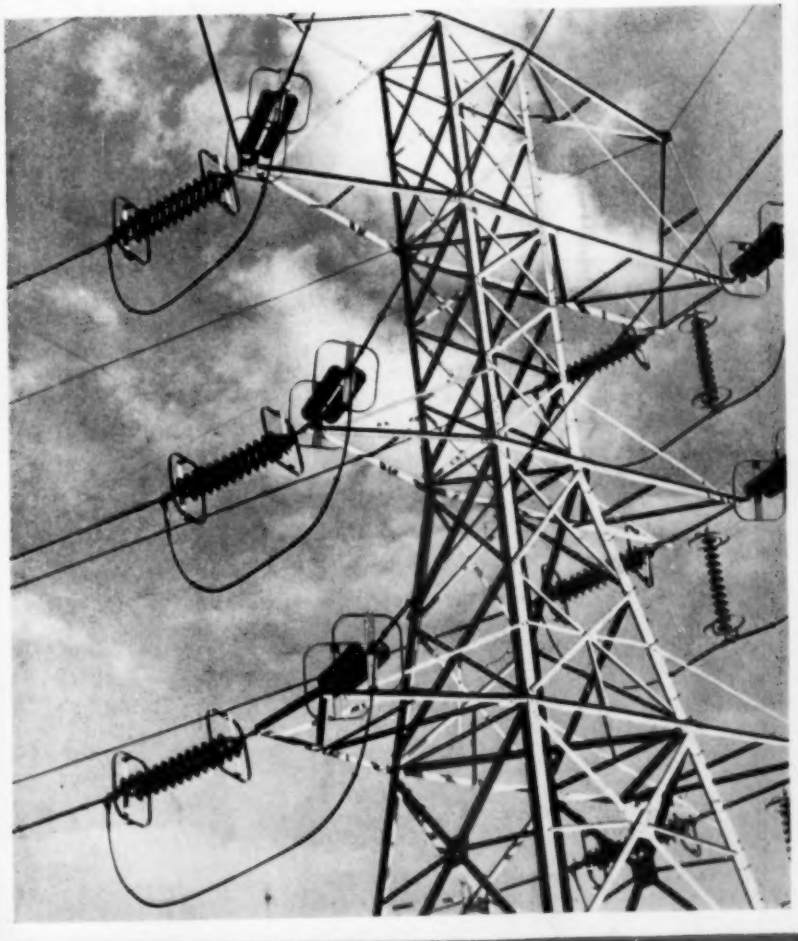
THE WEEKLY SUMMARY OF CURRENT SCIENCE •



SEPTEMBER 14, 1935

Network in Steel

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A SCIENCE SERVICE PUBLICATION

SCIENCE NEWS LETTER

VOL. XXVIII *No. 753*

The Weekly Summary of Current Science

Published Every Saturday by

SCIENCE SERVICE

THE INSTITUTION FOR THE POPULARIZATION OF SCIENCE organized 1921 as a non-profit corporation, with trustees nominated by the National Academy of Sciences, the National Research Council, the American Association for the Advancement of Science, the E. W. Scripps Estate and the journalistic profession.

Edited by WATSON DAVIS

Subscription rates—$5.00 a year postpaid; two years $7.00; 15 cents a copy. Ten or more copies to same address, 5 cents a copy. Back numbers more than six months old, 25 cents.

Canadian subscribers please add 50 cents a year, foreign subscribers 75 cents a year to regular subscription rate to cover postage.

Members of the American Association for the Advancement of Science have the privilege of subscribing to the SCIENCE NEWS LETTER at the reduced price of $3 per year. Application for this privilege should be accompanied by privilege card obtained from the Permanent Secretary, A.A.A.S., Smithsonian Institution Building, Washington, D. C.

In requesting change of address, please give your old address as well as the new one in notification to Circulation Department, SCIENCE NEWS LETTER, 2101 Constitution Ave., Washington, D. C., at least two weeks before change is to become effective.

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Publication Office, 1930 Clifton Ave., Baltimore, Md., Editorial and Executive Office, 2101 Constitution Ave., Washington, D. C.

Address all communications to Washington, D. C. Cable address: Scienserve, Washington.

Entered as second class matter October 1, 1926, at the post-office at Baltimore, Md., under the act of March 3, 1879. Established in mimeographed form March 13, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Advertising rates furnished on application.

Member Audit Bureau of Circulations.

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DO YOU KNOW?

In the hot summer of 1934, Wrangell, Alaska, had a temperature record of 100 degrees.

The song of the trumpeter swan has been sound-photographed in Yellowstone Park.

Triplets are being scientifically studied in the Institute of Child Welfare at the University of California.

Natives in Sumatra believe that earthquakes occur because an insect bothers the bull that holds the earth on its horns.

Poison ivy sometimes goes by other names, such as poison creeper, markweed, picry, mercury, and three-leaved ivy.

The so-called sea elephant is properly called an elephant seal, says the Field Museum, since the animal is a true seal, no relation to elephants.

An Indian picture on an earthenware bowl found in Arizona is thought possibly a prehistoric record of a great meteorite fall, observed by Indians.

Termites will not fight their own kind, says one zoologist, but the termite soldiers wage their wars chiefly on the defensive against other insect species.

The Pacific Ocean covers more world area than all the land masses combined.

The elephant seals are the biggest of seals, some attaining a length of 17 feet.

Liquid though it is, milk contains more solids by weight than oysters, tomatoes, asparagus, lettuce, or beets.

An old Babylonian proverb for school children said: "He who shall excel in tablet writing shall shine like the sun."

The new cotton planting attachment, with which seed are planted at varying depths, insures a stand of cotton under a variety of weather conditions.

The copper industry has profited by the trend to air conditioning, the railroads alone having used over 5,000,000 pounds of copper in this connection.

A lion-hunter recently discovered a new lake 12,000 feet above sea-level on Mount Kenya, Africa, and was mystified to find this mountain lake lukewarm.

Flint implements two inches long and some much smaller, have been found at English sites of the Old Stone Age, leaving archaeologists puzzled to account for their use.

WITH THE SCIENCES THIS WEEK

Most articles are based on communications to Science Service or papers before meetings, but where published sources are used they are referred to in the article.

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PSYCHOLOGY

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What is a "primary cause" of mental disease? p. 166.

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Which teachers have least trouble with school authorities? p. 169.

Why do babies laugh? p. 169.

Can new-born kittens taste? p. 174.

PSYCHOLOGY

Learning To Stand Is Roundabout Process

Baby at Four Weeks Is in Better Position For Getting Up Than He Is Again for Next 40 Weeks

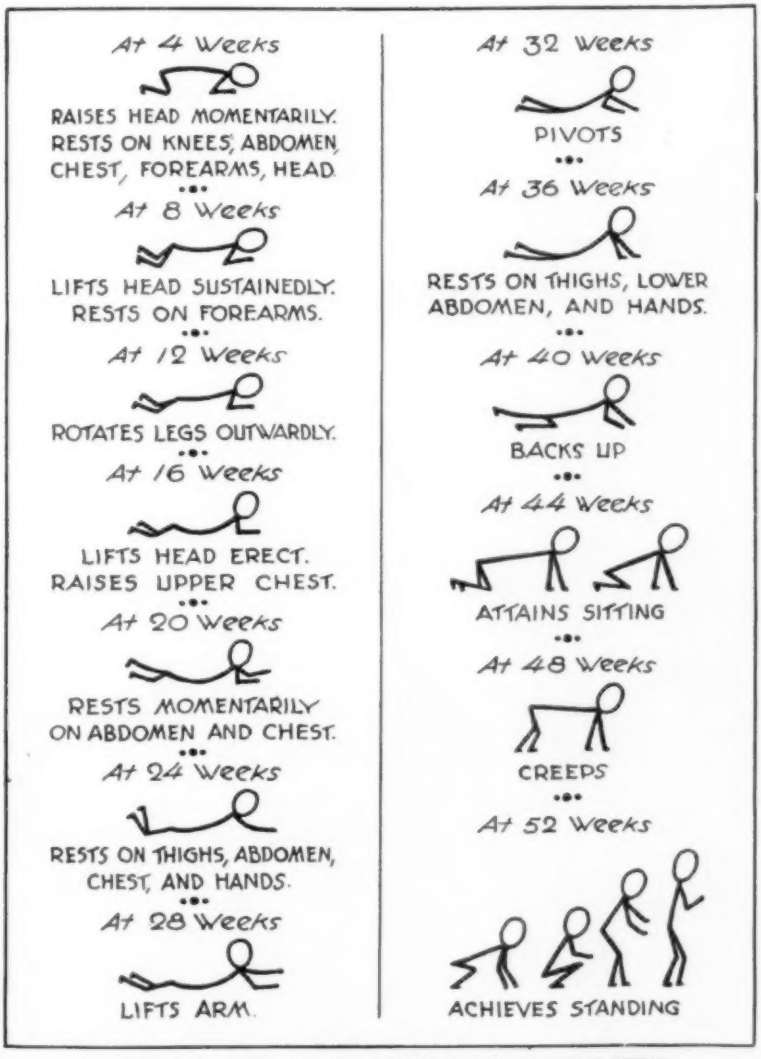
BABY, at four weeks old, lying in his characteristic position all curled up with his legs under his tummy, is in a more favorable position for getting up into an upright posture than he will be again until he is 44 weeks old.

During the intervening weeks, he goes through a regular pattern or progression of typical poses which carry him in a roundabout way through the squirming and crawling stages toward the perpendicular pose which distinguishes man from the lower mammals.

But after he is four weeks old, it is not again until he is nearly 11 months old that he again draws his legs up under him into the best position for getting upright. This curious indirection in development was pointed out to psychologists at the meeting of the American Psychological Association at Ann Arbor, Mich., by Dr. Helen Thompson, of Yale University.

"Nature appears to have followed a most inefficient plan," she commented. "Or is it that she has remodeled a primitive structure? It would be of interest to make a comparable study of primate development to see if in the less highly organized animal the developmental process is a more direct one."

Dr. Thompson, working with Dr. Arnold Gesell, has made a detailed study, by observation and motion pictures, of the growth and development of normal healthy babies of typical middle-class families. A sort of time-table of the poses achieved by 50 per cent. or more of babies at various age levels has been worked out by Dr. Thompson.



WHAT A BABY CAN DO WHEN LAID FACE DOWN

Baby's Time Table

At four weeks the average baby can lift his head momentarily, but typically rests with back arched and knees and elbows drawn up under him. By eight weeks he can hold the head up for a period. At 16 weeks he can raise his upper chest. By 28 weeks he can raise himself up enough from the prone position to lift one arm. From that time on the arms are gradually brought back under the body until the chest and later the whole trunk can be raised up. Still the legs are not working right for crawling, so at this stage the baby frequently pushes himself backward in his efforts at crawling. When he is 44 weeks old, he can raise himself enough to push himself into a sitting position from being flat face down. By 48 weeks he can really creep. And when he is 56 to 60 weeks old, he is able to push himself up into a standing position without aid.

Development is Gradual

With help he can stand much earlier than that, being able to support his entire weight, so long as he is steadied, when he is only 32 weeks old and pulling himself to standing position with the help of a rail when he is only 48 weeks old. He can maintain himself in a pose much earlier than he is able to get into it himself unaided, Dr. Thompson found.

The ability to stand or to walk alone, which in some babies seems to come so suddenly, is really the outgrowth of a slow and gradual development of many factors, she pointed out. It is the hip joint that is the last to straighten out fully and complete the upright pose.

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The birds known as mound builders, in the East Indies, take no care of their young, babies hatch by heat of the sun and start flying after a day or two.

An Australian scientist is in Florida, seeking insect enemies of the cocklebur which can be used to fight American cocklebur now rampant in Australia.

ANTHROPOLOGY

Priest-Scientist to Seek Earliest Human Ancestors

MANKIND'S earliest cradle will be sought in Central Asia by the noted French student of human pre-history, Pére P. Teilhard de Chardin, who will take the field this fall.

This announcement was made by Sir Arthur Smith Woodward of the British Museum, in the course of his address as president of the section on anthropology, British Association for the Advancement of Science.

The project was originated by the late Dr. Davidson Black, who first gave to the world the scientific details of the ancient skeletons now known as Peking Man. He planned to make a careful study of the pre-glacial Tertiary deposits in south Central Asia, and in 1932 actually travelled overland from China to Syria, passing through the region under consideration. Unfortunately, he died before he could carry out his project, and Pére Teilhard, who was closely associated with him in the last few years of his scientific work, has undertaken to see it through.

The central Asiatic uplands are indicated as a promising place to explore for the remains of earliest man for more than one reason. Sir Arthur called attention to a supporting basic principle in the study of evolution laid down by an American scientist, the late Dr. W. D. Matthew of the University of California. Dr. Matthew pointed out that it would be reasonable to expect the highest evolved forms of a given line of development to be in or near the place of original development, and that lower forms would be found at the outer fringes of its total area of distribution.

The relatively few remains of very early man that have been found form a rough circle around Central Asia: they include Piltdown Man in England, Heidelberg Man in Germany, Peking Man in China and Trinil Man in Java.

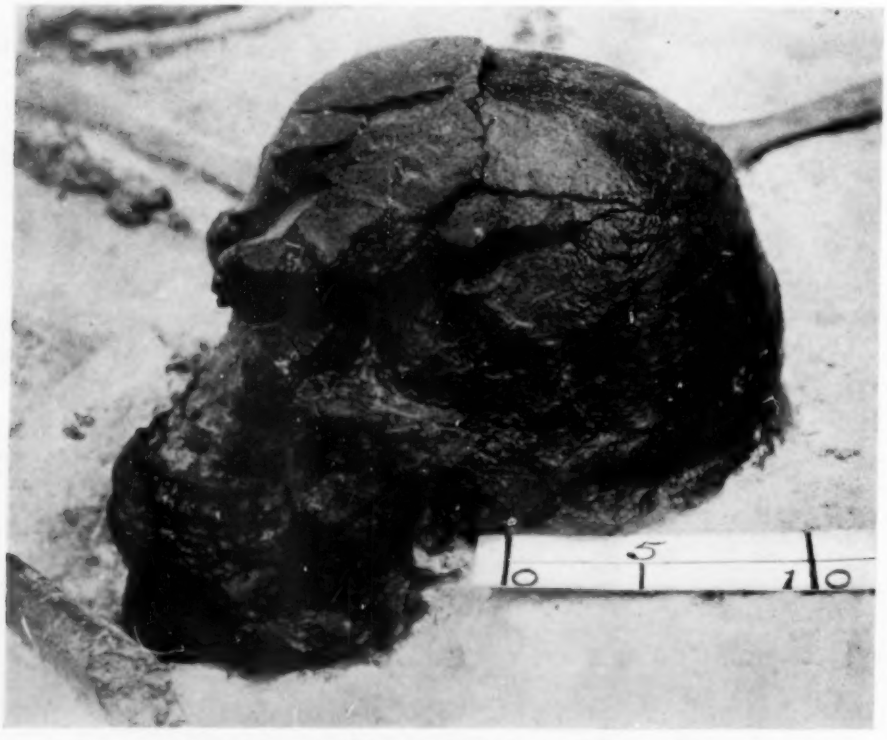
Central Asia is a "good bet" for manward evolution from a possible apelike ancestral stock, on grounds of geologic history, Sir Arthur continued, citing in support other earlier researchers. He said:

"The east-to-west ridge of the Himalayan Mountains was gradually raised up at the time when northern India was covered with a great forest which swarmed with apes of many kinds. The formation of the ridge separated off a northern portion of the forest which became subject to comparatively inclement conditions.

"The apes stranded in this northern portion would be disturbed by the extensive destruction of the trees, and the survivors would be driven to be ground-apes and change their habits of feeding. They would thus be modified in the direction of man.

"Regarded from the zoological point of view, of course, man is an arboreal mammal which has left the forest. His remote ancestors, by continuing to live in the forest, preserved their jaws, teeth, and limbs nearly on the primitive mammalian plan while the brain alone made progress."

Science News Letter, September 14, 1935



PALESTINE'S "MODERNISTIC" NEANDERTALER

Face and jawbone undoubtedly Neandertaloid, Palestine Man's eyebrow ridges are less prominent than those of his European cousin, and his braincase has a higher arch.

ANTHROPOLOGY

Palestinian Man Quite as Old As Low-Browed Neandertal

PALESTINE'S earliest known cave men, though they had skulls much more "modern" than those of their fellow-members of the Neandertal race, were nevertheless earlier than many of their low-browed kindred, and at least as early as any of them.

This verdict was delivered before the meeting of the British Association for the Advancement of Science at Norwich, in two reports submitted by three of England's most noted students of early man, Miss Dorothy A. E. Garrod, Theodore D. McCown and Sir Arthur Keith.

Palestine man is represented by three practically complete skeletons and the more or less fragmentary remains of a number of others, all found in two cave locations in the Mount Carmel region. They were found several years ago, but the bones were so rigidly imbedded in the stone-hardened earth of the old cave floors that many months of most careful chiseling have been necessary to free them for scientific examination.

The skulls, though undoubtedly of the Neandertal type, have relatively little of the heavy, beetling, almost gorilline eyebrows that characterize the European Neandertalers. There are also a number of other "modern" features about them.

Yet when Miss Garrod examined the stone implements and the broken animal bones found with them in their caves, these proved to be of very early age. The bones were those of animals belonging to

a warm, moist climate, and the flints were of a type elsewhere associated with the earliest finds of Neandertal men.

The two together are believed to indicate that Palestine man probably lived during a warm period when the glaciers of northern Europe had retreated for the time being, which puts him back among the earliest of human beings whose bones and cultural remains are at all well known.

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ARCHAEOLOGY

Chinese of New Stone Age Lived Like Indians of West

CHINESE of Shansi province, in northern China, were farmers in the New Stone Age as they are farmers now. They lived primitively, and some elements of their culture are suggestive of those of the American Southwest, though there is no direct connection between the two.

Explorations by archaeologists of the Freer Art Gallery, a department of the Smithsonian Institution, have shown how Chinese lived and worked among the fine-soiled loess bluffs in the Shansi region, some 2,000 years ago. Their findings are incorporated in a report, just published, by C. W. Bishop, associate curator of the Gallery.

They lived in round pit dwellings, as some of the ancient Southwestern Indians did. These Chinese pit dwellings averaged ten feet deep, were shaped like bee-hives, and had plastered walls. Entrances were at the top. Modern natives of the district dig their dwellings, like artificial caves, into the sides of the loess bluffs.

They cultivated the soil with stone and shell hoes, and used stone and shell in making their arrowheads. Other materials used in their tools were horn, bone, and presumably wood.

Their principal crop seems to have been millet, still widely used for food in northern China. Their only domestic animals were pigs and dogs.

They knew the arts of spinning, weaving, basketmaking and pottery. In the latter craft, they first made pots by the "coil" method, but in the later days of the New Stone Age developed some kind of potter's wheel. Hemp seems to have been their principal, perhaps their only, source of fiber for cord and cloth.

Bones of the dead, found piled helter-skelter, suggest that they may possibly have practised ceremonial cannibalism.

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GEOLOGY

Continents Rise and Sink Through Long Cycle of Ages

Evolution of Grass Called Greater Event Than Raising of Highest Mountains

GRASS was glorified above earth's highest mountains, in the address that opened the annual meeting of the British Association for the Advancement of Science. The speaker was the Association's president, Dr. W. W. Watts, professor of geology at the Imperial University of Science and Technology, South Kensington.

"It is perhaps not too much to say that the magnificent outburst of energy put out by the earth in the erection of the Alps, Andes, and Himalayas in Tertiary times was trivial in its influence for man's advent and his successful occupation of the earth in comparison with the gentle but insidious growth of 'mere unconquerable grass' and its carpet of 'wise turf' which in some form clothes by far the greater part of the land of the globe," Prof. Watts declared.

The speaker based his estimate on the importance of the grasses on the evolution of mammals, particularly those used by man for food, clothing, burden-bearing and many other purposes. Before grass evolved, comparatively late in earth's long history, herbaceous animals were browsers, and mostly solitary. When grass came, some of them modified their habits to feed on it, and in time they became gregarious, thus forming the foundation of flocks and herds even before man appeared on the scene to claim leadership of those flocks.

In the course of his address, Prof. Watts undertook to find a geological mechanism to account for the tremendous changes in the extent of the sea during the course of geologic time. In some ages, the sea covers most of the land areas; in others, it recedes until it occupies only the true ocean basins themselves. The present is a time of such recession.

The explanation offered is that the continental land masses float, like great rafts of rock, on an underlying layer of rock of a different kind. This underlying massive stratum passes through phases of solidification and liquefaction, as a lake in northern lands is ice in winter and water in summer. During the liquid phase, the continental rock rafts sink lower, and the sea partially covers them. During the solid phase, the masses rise higher, and the sea drains off again.

These phases are very slow, the time from change to change being measurable in scores or even hundreds of millions of years. Their comings and goings are due to the development of internal heat in the underlying stratum, caused by the radioactivity of the rock material itself. When enough heat has accumulated, they liquefy after a period of slow "boiling up" lasting many ages, they cool and solidify again.

At present the earth is in the "solid" phase, with the continents floating high.

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PSYCHOLOGY

Spiritist Mediums May Be Split Personalities

ARE SPIRITIST mediums persons with dual personalities? Are their "controls," the shadowy personalities that purport to give them messages from the other world, merely their other, "opposite" selves?

A suggestion that this may be the case was offered before the meeting of the British Association for the Advancement of Science, by Whately Carington, well-known English psychologist.

Mr. Carington subjected a considerable number of mediums, both in their normal condition and in the trance state, to what psychologists call the word-association test. This consists in the examiner saying one word, and the subject answering with the first word that comes into his mind. The answer gives a picture of the mental state of the subject.

Thus, to the word "ball," a small boy might answer "bat," while a débutante might answer "dance," and a soldier "cartridge."

A person with dual personality, who is his "own opposite" in the second mental state, might give opposite reactions to the same test word. Take the most fa-

mous dual personality in fiction, Stevenson's Dr. Jekyll and Mr. Hyde, and say "cane." The benevolent Dr. Jekyll might respond, "take a walk," while the murderous Mr. Hyde would exclaim, "beat him up!"

This is the kind of reaction Mr. Carington got from his mediums. In their normal state, they gave one set of reactions to test words. In their trance, their "controls" gave the opposite set of reactions. This led Mr. Carington to suspect that a medium's "control" is no messenger from the spirit world, but simply an ordinarily suppressed "other self" who gets leave to speak up during the trance condition.

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PSYCHOLOGY

Scientists Do Best Work During Early Maturity

GREATEST achievements in science and literature are most commonly the work of men in their early youth, psychologists at the meeting of the American Psychological Association learned from a report by Dr. Harvey C. Lehman of Ohio University.

A sort of scientific or literary "batting average" was computed by Dr. Lehman for outstanding achievements in chemistry, physics, short story writing, and other fields of creative work. Each year of the scientist's life would count as "one time at bat" in this computation. Each important contribution would count as a "hit."

Chemists reached their highest batting average between the ages of 27 to 39. When only the 100 most important chemical discoveries or achievements were considered, Dr. Lehman found that they were made most frequently by persons who were about 30 years old at the time of their invaluable contributions.

This does not mean that if an individual has failed to make an important contribution to chemical science by the time he is 35 or 40 that he will never do so, Dr. Lehman pointed out. Among the scientists who were responsible for noteworthy contributions to this science, there were 100 who were credited with just one major contribution each. Of these, 34 per cent. were over 40 at the time of their single contribution, 19 per cent. were past 50; 5 per cent. were over 55; and one individual was 69 years old.

At the other end of the age range was William Perkin, who at 18 discovered the first coal-tar dye and gave the initial impetus to the present great dye industry.

For physicists, the age of highest "batting average" is attained between 30 to 34. For mathematicians it occurs between 28 and 38.

For inventors, from 30 to 34 are the most productive years. Thomas A. Edison, whose long productive period lasted for more than 60 years, had his most creative year when he was 35. Between the time he was 33 to the time he was 36, Edison took out a total of 312 patents, more than a fourth of all those he received during his lifetime.

The writers of short stories attaining the distinction of listing among the "best short stories" are likewise young when they make their contributions.

Their highest "batting average" comes between 30 and 34 years. The writers of great poems are mostly persons between 22 and 35.

The single exception, among the fields studied by Dr. Lehman, seems to be astronomy. Astronomers reach their most productive years between 40 and 44.

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BIOPHYSICS

Four Types of Brain Wave Formed During Sleep

WHEN you sleep, your brain's activity shows either "saw-tooth," "random," "spindles" or "trains" types of brain waves, studies at the Loomis Laboratory, Tuxedo Park, N. Y., by Alfred L. Loomis, Prof. E. Newton Harvery of Princeton University and Garret Hobart have revealed (*Science*, Aug. 30). The four terms denote the appearance of the wavy records harmlessly obtained with special electrical brain wave apparatus.

Whether your brain waves show saw-tooth, random or other patterns in the records is apparently connected with the different levels of consciousness or brain activity going on while sleeping. The saw-tooth type of brain wave appears only in children just after they have fallen asleep.

In the comparable stage of sleeping in adults the brain waves appear as trains. Gradually, as sleep becomes more profound, the trains become less numerous and finally change to the random type of wave pattern.

A sudden change from the random to trains type of wave can be obtained by talking to the sleeping person. The random type of wave, it is found, predominates in the brain wave patterns of children and young people in deep sleep.

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PSYCHOLOGY

Confusion of Causes Hampers Treatment of Mental Ills

PROGRESS toward the cure of the mentally sick is often hampered because the attending specialist is himself mentally muddled, and does not distinguish between the real causes of the conditions he is treating, and the mere symptoms that appear on the surface.

This challenge to psychologists and psychiatrists was laid before the meeting of the American Psychological Association by Prof. Knight Dunlap of the Johns Hopkins University.

One of the fruitful sources of this confusion about the true causes of mental afflictions has been the proneness of scientists and medical men who deal with abnormal psychology to swallow whole the plausible theories of certain fashionable schools of psychiatric thought, and then make their facts fit the theories. It is high time, he declared, to dig out the facts, and let theories be developed that will bring such facts into useful relationships.

Examining the causes of neuroses, Prof. Dunlap divides them into two main categories, primary causes and accessory causes. Primary causes are not necessarily displayed in symptoms at all; they are often physical rather than mental, and may be hidden from both patient and physician. They may include such things as malnutrition or physical illness during childhood. A tragically large number of cases, Prof. Dunlap believes, are traceable to the operation of circumcision, performed on boy babies as a well-inten-

tioned, routine measure of prophylaxis.

Accessory causes the speaker divided into several classes: predisposing, precipitating, determining and sustaining causes. Predisposing causes may precede the primary causes, but serve merely to make a set-up for them, just as in the field of strictly physical ailments a general run-down condition may serve as the predisposing cause which makes possible the activities of tuberculosis or typhoid germs, which are the primary causes of their respective diseases.

After the primary cause has had its opportunity to take hold, some seemingly minor thing, like a bad fright or a severe disappointment, will serve as a precipitating cause. And an equally accidental occurrence may select which of several possible sets of symptoms the patient will display; this would be a determining cause. Thus, a man might be all set to become a "mental case," but it would be a matter of a chance whether he would take to hallucinations, or "seeing things," or whether he would develop the distressing nervous twitches called tics.

Finally, after a primary cause has been ferreted out and cured, there may have intervened some other factor that will keep the diseased condition going. Such a thing would be a sustaining cause.

Prof. Dunlap declared his conviction that the relatively poor showing made by mental medicine so far is due to a considerable extent to the preoccupation of psychologists and psychiatrists with immediate symptoms and their failure to dig deeper to find the real primary causes.

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BIOCHEMISTRY

Second Male Sex Hormone Will Soon be Synthesized

Exact Analysis Points Way to Prevention Of Distressing Abnormalities in Human Beings

MALE SEX characters will be brought under control in their development, and distressing abnormalities in behavior will be subjected to experiments looking toward their elimination from the human stock, as the result of discoveries made in Swiss and Netherlands laboratories, reported at the San Francisco meeting of the American Chemical Society by Dr. L. Ruzicka of Zurich.

The basis of his statement is the definite determination of the chemical composition of a male sex hormone isolated last June by the Netherlands scientist, Prof. Ernst Laqueur. In the opinion of Dr. Ruzicka, the synthetic preparation of this hormone in sufficient quantities to provide ample material for studies of its effect in treating sexual abnormalities of male human beings, will be merely a routine matter requiring a few weeks or months.

This hormone is the second chemical messenger having to do with the development of male sex characters upon which Dr. Ruzicka has worked. The first was isolated from kidney secretion in 1931 by the German chemist Dr. M. Butenandt. In 1934 Dr. Ruzicka and his assistants succeeded in producing this hormone in the laboratory from cholesterol, a widely distributed organic substance found abundantly in the yolks of eggs.

Through the experimental material thus provided, it was possible to demonstrate that there must be two male sex hormones, one present in kidney secretion and the other in the sex glands themselves. The isolation of this second hormone proved to be difficult, partly because it occurred in such small quantities, roughly in the ratio of one part in a million of glandular tissue.

Comparison of the effect of the artificially produced hormone with that occurring naturally in the tissue of male sex glands indicated that the difference between them was more a matter of potency than of chemical nature. In the light of this and other findings, Dr. Ruzicka explained, he predicted the empirical formula of the second hormone and prepared some of it in the laboratory.

When Prof. Laqueur succeeded in isolating the naturally formed hormone from gland substance, he found that it conformed closely to the formula predicted by Dr. Ruzicka, and the natural hormone could be converted into the substance prepared by Dr. Ruzicka by a simple process of oxidation.

As a result of these studies, the Swiss scientist stated, it is safe to say that both sex hormones can be manufactured in the laboratory. Both of them, like theelin, the female sex hormone, are derivatives of the widely occurring substance cholesterol. The male hormones differ in formula by two atoms of hydrogen. The female hormone contains six less atoms of hydrogen and one less of carbon, but has not yet been prepared synthetically.

The action of the second male sex hormone is so powerful that it will increase the weight of certain sex organ tissues in abnormal rats by more than four thousand per cent. Whatever use may be made of it in the treatment of human beings, Dr. Ruzicka warns, will have to await results of long and careful experimentation.

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COLLARED FOR HIS OWN GOOD

A light wooden collar solved the problem of how to prevent this monkey in New York Zoological Garden's Animal Hospital from disarranging with his teeth the bandages upon his broken arm. (Courtesy Bulletin N. Y. Zoological Society.)

GEOGRAPHY

Sahara Desert Spreading One Kilometer a Year

SAHARA desert sands are spreading southward well over a half mile a year. During the past 300 years they have encroached some 186 miles into what was once fertile farm and grazing land.

Unwise methods of farming, grazing and forest use are making a present of some of the best lands in West Africa to the Sahara Desert, Prof. E. P. Stebbing of the University of Edinburgh told the British Association for the Advancement of Science.

Prof. Stebbing's observations were made during a tour last year through parts of several British and French colonies in West Africa. Three factors, in his opinion, contribute most heavily toward this encroachment of the desert on lands once fit for human occupation.

The natives practice what is called "shifting agriculture." They clear a piece of land, burn the felled trees, cultivate the soil for a year or two or three, then move on to repeat the performance elsewhere, leaving the abandoned clearing to grow up into "bush." The forest does not take it back.

A second factor is the further destruction of the forests by fires deliberately set.

Increasing populations depending on cattle, sheep and goats have introduced the third factor, overgrazing. Stripped of its binding cover of grass, the soil dries out. Water fails, both for the restoration of the range and for the replenishment of the wells.

Science News Letter, September 14, 1935

DIETETICS

Rhubarb and Seaweed Rival Spinach as Vitamin Sources

SPINACH, traditional rebellion-rouser at the younger generation's dinner table, now has rhubarb and seaweed as rivals in its role of vitamin source.

At the meeting of the American Chemical Society, Prof. E. R. Norris and Mary Simpson, of the University of Washington, reported on their investigation of the vitamin content of seaweed. Seaweed is used as food in various parts of the earth, they pointed out, and indirectly it serves as a vitamin source for all the fish and other animal life of the sea. It is therefore of practical importance to know that several species of seaweed, including those commonly used as human food, are at least fair sources of the scurvy-preventing vitamin C, and also contain vitamin B.

Results of research on spinach and rhubarb were presented in a joint paper by Drs. D. K. Tressler and G. L. Mack of the New York State Agricultural Experiment Station, and Dr. C. G. King of the University of Pittsburgh.

Spinach is not just spinach, their investigations showed. When it is raised in upland gardens it contains about 50 per cent. more vitamin C than is found in spinach raised on muck land. Also, how long it has been on the market is a matter of considerable dietetic importance, for when held at ordinary room temperatures it loses half of its vitamin C in three days and practically all of it in a week. This difficulty can be overcome by chilling, however; spinach kept in a good refrigerator showed very little vitamin C loss. Age at harvesting was not found to be much of a factor, nor was there any significant difference in vitamin content between different named varieties of spinach. The vitamin was found practically altogether in the leaves; very little was present in the stems.

Rhubarb was found to be untemperamental, physiologically. Its vitamin C content was practically constant, regardless of state of maturity. Neither was there any notable difference between the two garden varieties tested.

Science News Letter, September 14, 1935

METEOROLOGY

Last Summer's Rainfall Normal for Most Regions

DESPITE drought, that came to the West in mid-summer and persisted throughout August, the summer's rainfall for the country at large this year was about normal, a summary just completed by the U. S. Weather Bureau discloses.

The study covers the period from March 1 to August 31, which embraces most of the growing season as measured by the staple crops. The precipitation was above normal in most Central Valley sections, the eastern Great Plains, parts of the Middle Atlantic region, the southeastern coast, the far west and the Northeast.

Rainfall was deficient in the Southwest, most of the Northwest, and in some New England and Southeastern localities. In western Kansas and eastern Colorado, famed as the "dust bowl" of the great drought of 1934, there was still a marked rainfall deficiency, precipitation being less than 75 per cent. normal, while in southern New Mexico and western Texas it was less than half.

Science News Letter, September 14, 1935

IN SCIEN

PSYCHOLOGY

High School Students Worry About Money, Not Sex

YOUNG people today are much more concerned over money problems and their health than they are over sex, despite present-day grown-ups' concern over "necking."

A survey of junior and senior high school students shows that they consider their most serious problems to be in the fields of money, health, study habits, and personal attractiveness, Dr. Percival M. Symonds, of Teachers College, Columbia University, told psychologists at the meeting of the American Psychological Association.

The least problem concern of these boys and girls is sex, he said.

The problems of boys and girls are very much alike, it was found, but the boys showed somewhat greater concern over matters relating to sex and money. Girls are more concerned over whether they are personally attractive.

Interests, like worries, are much alike for both sexes and are stronger concerning health, recreation, money, and manners and courtesy, and least with respect to the daily schedule and civic affairs.

Boys are more interested than are girls in health, sex, safety, and money, and show less interest than do girls in manners, personal attractiveness, the daily schedule and getting along with other people.

Science News Letter, September 14, 1935

METEOROLOGY

Twin Hurricanes Rare Event in American Weather

LABOR Day's twin hurricanes, that lashed opposite sides of the Gulf of Mexico and wrought havoc in Florida, were an unusual occurrence in American weather. As a rule, only one of these roaring disturbers of the peace of the tropic seas turns up at a time.

The first pair of hurricane twins ever to appear in American waters, so far as U. S. Weather Bureau records indicate, occurred on Sept. 5, 1933. Two more pairs appeared during that year, which was an all-time record year for hurricanes, with a total of twenty.

Science News Letter, September 14, 1935

EN FIELDS

PSYCHOLOGY

Satisfied Teachers Older, Come From Happier Homes

WHAT sort of person can be happy in a teaching job?

This question is partly answered by replies of 500 teachers to about 200 questions circulated by Dr. Robert Hoppock, of the National Occupational Conference, and reported to the American Psychological Association. The 100 best satisfied with their jobs were compared by Dr. Hoppock with the 100 who were least satisfied.

Satisfied teachers are more often those who enjoy better relationships with their superiors and associates, he found. They feel that they are more successful. More of them teach in large cities. They average about seven and a half years older than the dissatisfied group.

Dissatisfied teachers show more signs of emotional maladjustment. More of them report that their parents were not happily married.

Science News Letter, September 14, 1935

BIOCHEMISTRY

Anti-Anemia Substance Isolated From Liver

A SUBSTANCE which appears either to be, or to contain, the long-sought active chemical principle in liver —responsible for the wonderful effect of liver in regenerating blood in pernicious anemia—has been isolated by Drs. H. D. Dakin and Randolph West of Presbyterian Hospital, New York.

Dr. George R. Minot and Dr. William Murphy of Harvard Medical School first showed the value of liver as a remedy for this previously fatal disease. The nature of the haematopoietic, or blood-producing, factor in liver has, however, hitherto remained elusive although many scientists have been on its track. Drs. Cyrus H. Fiske, Y. Subbarow and Bernard M. Jacobson of Harvard Medical School, at the meeting in Atlantic City, N. J., of the American Society for Clinical Investigation, announced apparent progress in this research.

The substance now reported by Drs. Dakin and West is obtained from liver extract by a highly specialized process of precipitation. It has been tested clinically on a considerable number of patients of the Presbyterian Hospital, and the large majority of cases have markedly responded to it.

In one of a number of similarly satisfactory cases the count of red corpuscles had increased from 0.9 million to 2.1 millions and the proportion of the special kind of blood cells called reticulocytes had increased from three per cent. to twenty-eight per cent. on the twelfth day after the beginning of treatment.

The substance is given by injection; it appears to be of proteid character, there being thus a tendency for its chemical nature to be changed—and its potency decreased—by digestion if administered by mouth.

With the proper caution of research workers, Drs. Dakin and West point out that the available evidence seems to be actually against the view that the substance which they have isolated is of a single chemical nature.

Science News Letter, September 14, 1935

GEOLOGY

Lake Erie Was Once Part Of Vast Island in Sea

LAKE ERIE, now one of the world's largest bodies of fresh water, was solid land, and part of an island surrounded by salt water, some 300 million years ago.

This picture of one episode in the ups and downs of the earth's uneasy, heaving crust is given in a report to the Smithsonian Institution by A. S. Warthin of Vassar College and G. A. Cooper of the staff of the U. S. National Museum in Washington.

This ancient sea covered most of New York, Ontario, Michigan and the surrounding country, but had a great island, or possibly an area of very shallow water, in the territory covered by most of Lake Erie and the states of Ohio, Indiana and southern Michigan.

So shallow was the sea in wide stretches that its bottom was literally alive. Instead of having relatively restricted coral reefs in narrow zones, it had innumerable low mounds of coral spread over a considerable area. Elsewhere, as in the neighborhood of the present Alpena, Mich., they rose into the form of small, conical hills.

On the margins of the coral formations, crinoids, often called "sea lilies," were abundant. These stalked relatives of the starfish have left greater deposits of fossils here than can probably be found in rocks of the same geologic age anywhere else in the world.

Science News Letter, September 14, 1935

PSYCHOLOGY

Baby's First Laugh Comes Because He Has Been Fed

BABY'S first laugh lights up his tiny face for the simplest of possible reasons: he has been hungry, now he is fed, and he is satisfied. Later, he learns to laugh for other causes.

Dr. C. W. Valentine, professor of psychology at the University of Birmingham, patiently watched a lot of babies of all ages, noting when and why they laughed, and collating the causes.

First laughter by a baby, he said, is traceable to a definite satisfaction: being fed. Later, at about three months, the baby will laugh when some one else laughs—he has learned social laughter.

A month later, he laughs when something sudden happens, to surprise him, or even to shock him a little. When he is half a year old, he will laugh at almost anything that is repeated often enough, and also at anything that seems incongruous or unusual.

At one year, the baby is enough a citizen of the world to be trying his powers, and whenever he finds he can perform some new stunt hitherto impossible, he rejoices with a laugh.

Only after he has passed through all these stages in the evolution of laughter does he learn the thing that seems to be the basis of so much of adult amusement, laughter at the slight discomfiture of somebody else.

Science News Letter, September 14, 1935

ICHTHYOLOGY

Flying-Fish's Fins Move, But Do Not Help in Flight

FLYING-fish do have movement in their fins while they are in the air, but it does not aid them in their flight. Definite answer to this old and long-disputed argument about flying-fish was given before the British Association for the Advancement of Science, by Dr. G. S. Carter and J. A. H. Mander.

The often-observed movement of the flying-fish's fins, they found, is transmitted to them by the tail, which continues to lash the water hard even after most of the fish is clear of the surface. Once in the air, the fins are held rigid, and the "flight" is really a glide.

Dissection of a number of specimens confirms these observations, Dr. Carter continued. There is nothing about the fin muscles that could give them the necessary movements to make them function as wings.

Science News Letter, September 14, 1935

ICHTHYOLOGY

Fish That Bite Men

Shark Attacks on Bathers Well Authenticated, Though Not so Frequent as Many "Scare-Head" Stories Allege

By DR. FRANK THONE

SHARK scares are always good for front-page space in the papers. There is something fascinating in the terror of those rows of razor-edged, three-cornered white teeth that holds the eye and the imagination, even as in childhood we were enthralled by the "great teeth" of the Big Bad Wolf that gobbled up Little Red Ridinghood's grandmother —and meant to take Little Red Ridinghood herself, next. One school of psychologists might speculate that there is a kind of mental evolutionary throwback about it all, to an ancestral state when Teeth meant Death, and being eaten afterwards, as Teeth still mean death and devourment to myriads of animals today.

Whatever may be the cause, there is no doubt about the effect. We gobble up shark stories in the newspapers, even as we imagine the sharks would like to gobble us up. There is nothing at all new in the idea of a fish biting a man, but it is nevertheless sure-fire News.

Nail-Sharks and Bottle-Sharks

Such fascination there is in the thought of attack by a shark, that sharks get much more newspaper notice than they really merit on the basis of their own exertions. Let a bather snag himself on a nail on a piece of drifting timber, or sit down on a broken bottle in shallow water, or even see something he takes to be the sinister back fin of a shark cutting the water, and he (or she) yells shark-and-bloody-murder. And it makes good "copy" for the papers—and sprouts some more gray hairs for the managers of beach resorts.

But even when you have "played down" the false alarms of shark attacks, there remains a quite substantial and painful residue of true and authentic cases. Sharks do attack human beings, and while they seldom carry the attack to a fatal outcome they usually maul and bite their victims so badly that weeks in the hospital and dozens of surgical stitches are necessary before they can walk again.

From the warmer beaches of both the world's ends come stories of well-authenticated shark attacks. It is winter now in Australia, but when they were having their summer, last December and January, the shark situation received the attention of a careful student of marine life "down under," Gilbert Whitley. He reported his findings recently in the *Victorian Naturalist*.

He divided his records into ten-year periods. The number of authentic shark-attack reports in the decade 1912-1921 was 13; in the following decade, 1922-1931, it jumped to 45, and in the three-year period 1932-1934 there were 16 well-supported records. At this rate, the 1932-1941 decade might be expected to run up a record of somewhere near 60 serious shark-bites.

More Bathers, Not More Sharks

Mr. Whitley does not believe that Australian sharks are becoming wickeder, or necessarily more numerous. It is beach bathers, potential shark victims, who are more numerous, he suggests. As remedies, he offers the construction of "shark fences" enclosing bathing beaches, or where this is not practicable, the use of lookouts on specially built high towers or even in aircraft, to warn bathers ashore when Old Toothy is seen in the offing.

On our own shores, shark attacks seem to have occurred most frequently in the Florida region. They are usually blamed on the notorious Caribbean sharks, wandering northward out of their true bailiwick. They would not in any case have to wander very far, however, for Havana harbor is full of sharks—sometimes credited with assisting in the disappearance of too-troublesome *revolucionistas*.

Farther north, it is difficult to obtain any really well-authenticated shark-bite records. There was, to be sure, a major shark scare off the New Jersey coast back in 1916, much to the distress of Atlantic City and neighboring beach towns. But the actual shark damage (if sharks really caused it) was multiplied manifold by terrified imaginations. Sharks of man-eating size and disposition may be set down as extremely exceptional in northern waters.

What the northern boundary of really vicious sharkdom may be is still a matter of some doubt. For long it was claimed that such sharks never appeared north of Florida, but recently the director of the Charlestown, S. C., Museum, E. Milby Burton, made a critical investigation of all the recent cases of shark attack he could find. He limited his inquiry to victims whom he could locate and interview personally, and reported what they told him in the *Scientific Monthly*. Two of them consented to have photographs of their tooth-scarred legs published in corroboration of their testimony.

Perhaps the most vivid account, and certainly the most vivid scars, were offered by a youth named Drayton Hastie. He stated that while bathing at the north end of Morris Island, at the mouth of Charleston harbor, he saw what he took to be a shark-fin and swam out to investigate. The fin had disappeared, so Mr. Hastie concluded he had just been "seeing things."

Nevertheless, he said, "I did not like the idea of swimming with sharks all around, so I sat down in about three feet of water . . . I was almost certain that

TWELVE-FOOT TIGER SHARK

Taken off the Great Barrier Reef, Australia. Sometimes accused of being a man-biter.

in such shallow water I would be safe from anything large enough to bite.

"I felt a swerve of water, which was followed immediately by an impact which brought me to my senses. Something clamped down on my right leg. I was aware of a tearing pain up and down my leg, and I was being pulled outward by something which seemed to have the power of a horse.

"Looking down, I saw, amid the foam and splashing, the head of a large shark with my knee in its mouth, shaking it as a puppy would shake a stick in attempting to take it away from some one . . . I freed my right leg, only to have the monster bite me on the left one."

Sharks Eight Feet Long

Mr. Hastie broke loose and backed ashore. The whole thing happened in ten seconds, but so severely had he been bitten that his friends had much ado to get him to the army hospital at Fort Moultrie, where more than thirty stitches had to be inserted. He was transferred to the Riverside Infirmary, in Charleston, where he remained a patient for two weeks.

Both the week before and the week after the attack, specimens of sharks eight feet long were captured within a hundred yards of the scene of the accident. One of Mr. Hastie's friends who witnessed the attack said the shark that bit him was easily eight feet long. The marks on the bitten knee indicate a mouth diameter of ten inches, which is a fair fit for a shark of that size.

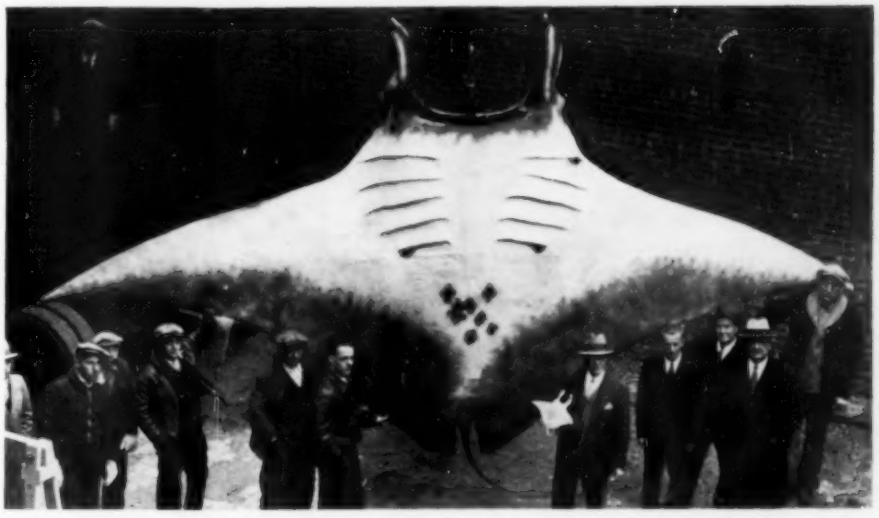
The captured specimens were identified as the yellow or cub shark, usually considered to be a West Indian rather than a South Atlantic species.

"Didn't Stop to Observe"

A second victim was attacked while standing in the water, and so badly bitten that over 100 stitches had to be taken in his left knee and leg. A Negro, who came to his rescue and helped him ashore, stated that he "saw about six feet of the fish—but didn't stop to observe closely."

In all, Mr. Burton lists five cases of shark-bite from the immediate vicinity of Charleston, which he believes to be "absolutely authentic." In addition, he records two "semi-authentic" cases. In both these cases the victims were women. Their injuries were real enough; but nobody actually saw the sharks, which leaves a slight margin of chance that some other voracious sea creature might have made the attacks.

All shark attacks recorded in American waters have apparently been by sharks scarcely big enough to do more than disable their victims. They are reported to be eight- or ten-footers—rarely larger. The real villain in the shark world, the true man-eating white shark of the tropical seas, reaches a length of thirty feet, and can easily kill and devour a grown man in a few slashing bites. Linnaeus, the great Swedish naturalist of the eighteenth century, credited this species, and not a whale, with being the "great fish" which in the Bible narrative "swallowed up Jonah" and kept him within, undigested, for three days and nights.



HUGE MANTA, OR SEA-DEVIL, A RELATIVE OF THE SHARKS
Terrible in appearance, but its reputed man-killing tendencies probably mythical.

Sharks With Six-Foot Jaws

But even this terrible monster drops to mere mackerel size as compared with a whale-sized species that swam the seas only a few million years ago. This giant is known only by its teeth—for shark skeletons are made principally of cartilage or "gristle," which does not form fossils. But these teeth, which are quite abundant in fossil deposits, are often a good six inches from base to point! By comparison with modern shark teeth, they indicate a jaw-spread of five or six feet, and an over-all body length of ninety feet, quite as large as the biggest living whales.

Of existing sharks, the largest are the whale sharks of the tropics and the basking sharks, which also reach the higher latitudes. The sharks harpooned so daringly by the Irish fishermen in the recent film feature, "Man of Aran," are basking sharks. Size limits of these giants are not as sharply known as they might be, but it appears probable that they both reach lengths approaching forty feet, with the honors perhaps a little on the side of the whale shark.

Fortunately for the seafarer's peace of mind, neither of these giant species is a man-eater. Their teeth are small, though numerous, and they seem to be content with ordinary prey—fish, squid and the like.

Finding human bones, clothing, etc. in a shark's stomach does not necessarily convict the shark of man-eating proclivities. Almost any shark that is large enough, and has strong enough jaws and teeth, will eat the bodies of drowned persons, but only a few kinds of sharks have the courage—or viciousness—to attack a living man. Dr. E. W. Gudger of the American Museum of Natural History, a widely known specialist on fishes, states that probably most man-eaters and man-maulers belong to the genus known by the forbidding name of *Carcharias*. Tiger-sharks are under some suspicions and in Australia the mackerel-sharks also; but the case against them is apparently not as yet quite conclusive.

Barracuda More Vicious

Sometimes sharks receive unjust blame for the attacks of the barracuda, a five- or six-foot fish with the jaws, teeth and truculent disposition of the muskallunge of the freshwater lakes of the North. Barracudas seem to be limited, in their American range, to the southern part of Floridian coastal waters, but there they make mischief enough.

Dr. Paul Bartsch, of the U. S. National Museum, likes to walk on the sea bottom with a diving helmet over his head, taking photographs of sea life with a specially equipped camera. He is not much concerned about sharks, but barracudas worry him. "The shark is a gentleman,"

says Dr. Bartsch. "You let him alone and he'll let you alone. But you never can be sure about a barracuda."

The manta, or sea-devil, a great wide-winged, two-horned creature related to the sharks, is often reputed to be a man-eater. Legend says it will smother a fisherman in its great embrace, and then swallow him. But it is doubtful whether it ever eats anything more formidable than oysters. The manta could more justly complain about the manta-killing activities of man, for sportsmen in the warm waters off southern California and Lower California like to fling harpoons into its tempting expanse of back, and then enjoy the somewhat hazardous thrill of being towed at high speed for hours by a half-ton of bewildered giant fish with the terror of imminent death upon it.

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Science News Letter, September 14, 1935

PHYSICS

Airplane Propeller Makes World's Noisiest Roar

SOMETHING more radical than better sound insulation of airplane cabins must be found by scientists if air travelers are to be spared the roar of airplane propellers, it appears from the report of E. Z. Stowell and A. F. Deming of the laboratories of the National Advisory Committe for Aeronautics at Langley Field, Virginia.

In a new study of noise from two-blade propellers the scientists have found that the greatest noise source is the roar of the fundamental frequency. This basic noise is a musical note having twice the frequency with which the propeller is rotating. In the propeller roar as many as 50 or 60 harmonics of this fundamental note appear.

Discussing the importance of propeller noise tests, the scientists state: "It is evident that, although passengers in a commercial airplane may find the noise temporarily disagreeable, the effect of the noise upon the pilots who are immersed in it day after day may be greater and even interfere seriously with efficiency."

The two-blade airplane propeller, they point out, radiates more noise as expressed in watts of power than does almost any other continuously operating device known to man. The only exceptions are certain special signalling devices.

Propeller roar due to the blades' rotation, Stowell and Deming found in experimental studies, has a maximum at about 30 degrees on each side of the propeller's axis of rotation. This angle is just about the one which passes through the passenger seats in cabins of commercial multi-motors airplanes.

At close range and at great distances the propeller roar of rotation dominates propeller noise. At intermediate distances, however, a second noise source may be prominent. This is the tearing, ripping noise caused by the periodic release of vortices from the trailing edges of each blade. The vortex propeller noise forms a continuous sound spectrum, it has been found, in the middle range of frequencies of from 1,000 to 5,000 cycles. Vortex noise is a maximum in the line passing through the axis of the propeller in both directions and a minimum in the plane of rotation of the propeller.

The fundamental rotational noise of a propeller is the most objectionable from the viewpoint of the airplanes, state the Langley Field scientists, for (1) it masks speech readily, and (2) insulation against this low frequency is difficult.

"No great improvement can result," they conclude, "from any scheme of silencing that does not include a reduction in the magnitude of this (rotational noise) component."

The propeller noise studies were made with a variable pitch two-blade aluminum alloy propeller eight and a half feet in diameter. The propeller's pitch angle was adjusted so that it absorbed 100 horsepower from its driving motor at 1,800 revolutions per minute.

The motor and propeller were 235 feet from the nearest obstruction and capable of rotating through 360 degrees so that the noise output at various angles could be obtained with a fixed microphone. Using a special apparatus, the electrical counterpart of the sound waves as generated in the microphone and the amplifying equipment was analyzed by frequency spectral parts and photographic records obtained of any portion desired.

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Grade crossing accidents took 1,554 lives in this country last year.

CHAMPION ROARER

PHYSICS

Stratosphere Balloonists To Seek Sun's Neutrons

NEW FIELDS of research in stratosphere balloon ascensions should include studies to see if neutrons are being shot out by the sun, Lord Rutherford of Nelson, F. R. S., widely known physicist and head of Cavendish Laboratory, Cambridge, told the meeting of the British Association for the Advancement of Science.

In laboratory experiments neutrons, fundamental units of matter out of which atoms are composed, make possible the transmutation of one element into another.

It might be possible to detect neutrons from the sun high in the earth's atmosphere, Lord Rutherford declared, and they should be looked for as high as scientists can reach in manned and unmanned balloons.

If neutrons occur in the sun and the other stars of the universe they should be very effective in causing breaking down and building up processes among the elements by the atomic transformation discovered by Madame Curie-Joliot

and her husband M. Joliot in their Paris laboratory.

The fears of scientists that the physical laws of the conservation of energy do not hold in experiments on atomic collisions are rapidly lessening, the veteran scientist-peer told his listeners. Up until last year, he pointed out, certain tests seemed to indicate that more energy was liberated in some types of atomic collisions than was put into them.

In his opinion, Lord Rutherford continued, recent studies on the nucleus of atoms justifies the assumption, that the conservation of energy holds for all atomic transformations.

New measurements on the masses of atoms by Prof. F. W. Aston at Cambridge University in particular, Lord Rutherford indicated, have shown that the masses of some elements were not previously known with sufficient precision. Such lack of knowledge, if not proving definitely that the conservation law holds, plainly strengthens the case for the hitherto basic principle of physical science.

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AERONAUTICS

New Stratosphere Flight To be Made in October

RAPID City, S. D., has been selected as the site for another flight of the stratosphere in October, officials of the National Geographic Society have announced.

Studies of the weather conditions at Stratobowl in the Black Hills for the last fifteen years disclose that October usually has periods of good weather long enough to make the flight a possibility.

In the decision which will send the Society-Army Air Corps balloon Explorer II aloft again, Rapid City won out over Scott Field, Illinois, as the take-off site. Much of the equipment is still at Rapid City, and it had been decided that if weather conditions at the two places were at all comparable for October the South Dakota site would again be used.

The entire top of the Explorer II is being rebuilt in the Goodyear Zeppelin factories in Akron, Ohio, and will be delivered to Rapid City this month.

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PHYSICS

High Temperatures Calculated For Radio Roof of World

Exceedingly Low Densities of Kennelly-Heaviside Layers Declared Traceable Only to High Temperatures

IT HAS been just ten years since the existence of the radio roof surrounding the earth—the layers of ionized atmosphere which reflect radio waves—was first demonstrated. Known as the Kennelly-Heaviside layer after the American and British scientists who first postulated its existence, these reflecting layers have been the subject of intensive research ever since.

Not one, but three, layers have been found which are now called the E, F_1 and F_2 regions at heights of roughly 65, 115 and 150 miles respectively.

Much useful knowledge has already been gleaned from the ten-year research, but few more startling suggestions have occurred than that just offered by Prof. E. V. Appleton, Wheatstone professor of physics at the University of London.

Reporting new tests, Prof. Appleton, with R. Naismith as co-worker, (*Proc. Royal Society*, July), suggests that in the F_2 layer, between 124 miles and 248 miles above the surface of the earth, the temperature at noon time in summer should be 1700 degrees Fahrenheit. Such extreme temperatures are needed to provide a reasonable explanation for his experimental findings.

A temperature of 1700 degrees Fahrenheit corresponds to 927 degrees on the Centigrade scale, which is sufficient to melt elements such as cadmium, calcium, lead, lithium, magnesium, silver, tin and zinc. No man-directed balloon with a magnesium alloy gondola may ever reach altitudes of 150 miles, but what would happen to it if it did makes one pause and think.

"Owing to the low molecular density of the air at the level of the region F_2," says Prof. Appleton, "we may expect marked heating by solar radiation. This can take place as a result of molecular dissociation, or as a transfer of energy to the electrons via excited molecules, or as a result of the process of ionization generally." Such heating reduces the density of the air at which the greatest ion production can take place.

In a shorter summarizing article (*Nature*, July 13), Prof. Appleton has discussed this same point as follows:

"It is not difficult to show that the abnormally low value of summer noon ionisation density can only be the result of a reduced summer air density at the level in question, otherwise we should have to assume that the solar ionising rays differed in quality from summer to winter. Such a reduced air density can again only be the result of an increased temperature. Putting these ideas into quantitative form, we find that the molecular temperature must be three to nine times as high on a summer noon as on a winter noon, and that the absolute temperature at a level of 300 km. must be at least 1,200° K on a summer day."

Three hundred kilometers amounts to about 186 miles, and 1,200 degrees K equals 1,700 degrees Fahrenheit.

Science News Letter, September 14, 1935

ENGINEERING

Tower and Insulators Spread Steel Network Against Sky

SYMMETRY and design typify the SCIENCE NEWS LETTER cover this week, in the illustration of a modern tower for electric transmission lines. The auxiliary copper leads carrying the current around the giant insulators can be seen hanging in large arcs at the left, near the center. The insulators must not only be of sufficient size to prevent a jump-over of the line voltage at thousands of volts to the ground but should also hinder, if possible, the much higher voltage of lightning strokes.

Science News Letter, September 14, 1935

●RADIO

Tuesday, Sept. 17, 3:30 p. m., E.S.T.

SCIENCE IN TRANSPORTATION, by Dr. C. F. Hirshfeld, chief of research, Detroit Edison Company.

Tuesday, Sept. 24, 3:30 p. m., E.S.T.

THE DEPRESSION AND MENTAL DISEASE, by Dr. Carney Landis, New York State Psychiatric Institute and Hospital.

In the Science Service series of radio addresses given by eminent scientists over the Columbia Broadcasting System.

AGRICULTURE

Post-Napoleonic Period Had Agricultural Adjustment Woes

GOVERNMENT control of agriculture, which agitates Great Britain no less than it does the United States, is no new thing under the sun. There is a striking parallelism between present efforts to straighten out the agricultural-economic tangle and efforts that were made after the last preceding great war, the Napoleonic struggle that ended just 99 years before the World War began.

At the Norwich meeting of the British Association for the Advancement of Science, Dr. J. A. Venn, president of Queens' College, Cambridge University, pointed out a whole series of striking similarities, and even more striking differences, between the two historic periods.

Poor Bore the Brunt

There is a modern tone, in spite of a superficial quaintness of expression, in the thunderings of a "leader," or editorial, quoted by Dr. Venn from an 1826 issue of the *London Times*:

"What the nation pants for, is a sensible fall of prices. Bread must be had cheap. Rents must be sacrificed to the lives of the people. It is monstrous impudence to talk about the ruin of the farmers from a lowering in the price of produce. The farmers want nothing better than low prices, if they can but get their lands at proportionate rents . . . Leave the loaf of bread to find its own value."

Yet despite the Times' demand for the sacrifice of the wealthy landowners for the benefit of the poor tenant farmers and the ultimate cheapening of the city workingman's bread, the poorer classes had to bear the brunt of economic maladjustment in the post-Napoleonic period.

"When summarizing the results of the policy followed during the post-Napoleonic war era, it is significant to observe that its cost to the Exchequer was negligible," Dr. Venn observed; "for, rocklike, it rested on the axioms that consumers should pay to the utmost . . . and that workers must, for the sins and omissions of statement, unavoidably suffer in full the blasts of an economic hurricane."

Times change. Dr. Venn mentioned some striking contrasts between the laws of then and now:

"Then, penalties faced the worker, who, with two or three of his fellows, 'combined' for the purpose of seeking an increase in his rate of remuneration; now punishment awaits the employer who fails to pay an independently determined minimum wage . . . Then, landlords were omnipotent; now, the tenant can virtually dictate his terms to a subservient owner."

Concluding, Dr. Venn offered a modest word of prophecy:

"Looking back on the past history of British agriculture, I am confident of one thing—whether that time be far distant or near at hand, the industry will resume its prosperity—its importance it has never lost—and unborn generations will regard the present epoch as affording one of those many trials through which, during countless generations, it has emerged unscathed but remodelled, this time not despite a policy of *laissez faire*, but as a result of considered action and preferential treatment of an all-embracing character."

Science News Letter, September 14, 1935

PSYCHOLOGY

New-Born Kittens Have Taste Discrimination

THE NEW-born kitten comes into the world with his eyes closed, but he is not taste-blind. He likes his milk. But he refuses water unless it is made more attractive by the addition of sugar. And he can tell the difference between plain milk and a drink to which sweet, sour, salt and bitter tastes have been added.

The ingenious method by which newborn kittens were enabled to make known to scientists what they are able to taste was described at the meeting of the American Psychological Association by Carl Pfaffmann, of Brown University.

An artificial "mother" consisting of a small nursing bottle was fitted with a rubber nipple to which a pressure-recording instrument was attached. As the kitten sucked the milk out of the bottle the negative pressures developed were recorded by the instrument. If the kitten sucked hard he liked his food, it was assumed.

With plain milk in the bottle, the record showed a regular sucking, but when salt, acid or bitter substance was added the record betrayed that the kitten knew the difference. The sucking record then was "distorted."

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AGRICULTURE

Agriculture In Britain Faces Serious Problems

BRITISH agricultural interests have problems of their own to face, no less than agriculture in America. The traditional "crusted conservatism" of the British farmer tends to aggravate the problems in spots, yet at the same time serves as a restraining influence on immature political and economic schemes, the British science journal (*Nature*, Aug. 10), points out editorially in commenting on opinions expressed by Sir John Russell, noted agricultural scientist.

One basic fact to be counted on, in the opinion of *Nature*, is the ingrained individualism of the British dweller on the land. He will cling to his own acres, and refuse to be swept into any collectivist scheme for large-scale management.

"That is all to the good," is the comment, "because state supervision failed during the late War; it failed in France in the Revolution, and it is proving a failure in Russia now."

However, that same individualism is proving an obstacle to present much-needed improvement in the general agricultural development in Britain. The land needs capital, especially for drainage. The small farm owner has none; neither has the landowner who rents his farms on a partnership basis. He is unable to keep up his end of the partnership.

Sir John, according to the report, looks upon proposals for "state farming" with considerable apprehension, yet cannot escape the fact that the only practicable source for farm-improving capital may be state financing, with a corresponding degree, at least potentially, of state control.

Whatever may be the way out that is finally chosen by British agriculture, both Sir John and the commentator on his opinions are agreed that changes are on the way.

They do not share the optimism of the Chancellor of the Exchequer, who declared recently before an audience of bankers that Britain has recovered 80 per cent. of her prosperity. They see "75 per cent. of our population living on or under the border-line of poverty," and hold that "we cannot be surprised at the economic unrest that obtains in so many quarters."

Finally, the opinion is expressed: "Until some solution or amelioration of the problem of the existence of poverty amidst plenty is forthcoming, substantial national progress seems out of the question."

Science News Letter, September 14, 1935

PLANT PATHOLOGY

Disease-Weakened Plants Fall Prey to Other Ills

PLANT diseases, no less than diseases of human beings, give new point to the old adage that "troubles never come singly." A plant, weakened by the attack of one fungus, falls prey to some other disease the more easily, just as a man may be prepared for pneumonia by an attack of the "flu."

Cases in support of this thesis were cited by F. T. Brooks of Cambridge University, in his presidential address, delivered before the botanical section of the British Association for the Advancement of Science.

When a log lies rotting on the ground, it is attacked by one fungus after another, as a rule, rather than by several species of fungi simultaneously. The species observe a regular order in their coming and going, resembling the "succession" among higher plants, where an oak forest, for example, succeeds one of pine, and afterwards beech and maple may replace the oak.

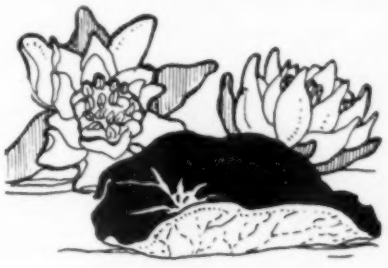
Varieties of wheat, bred to be especially resistant to the rust disease, may be attacked by mildew. Afterwards, rust is able to invade them where the mildew has been growing on their stems and leaves. The same "preparation" for rust may be made by another fungus disease known as bunt.

Another combination involves fungi and the invisible viruses of such diseases as leaf mosaic. The fungal cause of the terrible potato-blight disease, that caused famine in Ireland in the 1840's, followed by wholesale waves of emigration to America, was once resisted by Irish potatoes which now cannot hold out against it at all. Mr. Brooks cited the opinion of one of his colleagues that this increase in susceptibility was due to the prevalence of the virus disease, potato mosaic.

Science News Letter, September 14, 1935

BOTANY

NATURE RAMBLINGS *by Frank Thone*



Dislocated Names

RATHER odd, how we misname many familiar plants.

Water lilies, for instance, are not lilies at all. Neither are they what the Germans call them, "water roses." They are more nearly related to the flowers of the magnolia tree.

Again, that beautiful flowering tree called tulip poplar throughout the South and a large portion of the East is not related very closely to either the tulip or the poplar, though its flowers do look rather like tulips, and its large growth, broad leaves and soft wood do suggest the poplar. It also is a fairly close botanical cousin of the magnolia.

Calla lilies are not lilies. They belong to the arum family, being relatives of jack-in-the pulpit, caladium or "elephant-ear," and the strange, ill-smelling giant flower that sometimes get publicity under the name of sacred African lily.

Squirrel corn is not corn, and has nothing in common with corn. It is a small white spring wildflower, related to the more familiar Dutchman's-breeches and the red-and-white bleeding-heart of old-fashioned gardens.

Dogtooth violets are not violets, but lilies. The asparagus-fern of the florists is really a fine-leaved asparagus, not a fern; it might more appropriately be called fern-asparagus. The Spanish moss that drapes trees in the South is not a moss, but a relative of the pineapple.

Many plant names arise from similarities in shape to more familiar growths. Thus, grass has lent its name to the little flower known as blue-eyed grass, which is really an iris; also to the marine eel-grass, which belongs to a distinct family quite remote from the grasses.

Similarly, we have reindeer moss, which is a lichen; flowering moss, which is a portulaca, and "water moss," which is a name loosely applied to any fine-leaved or finely-divided green growth found in wet places.

Almost any spreading-topped tree or other tall plant in the tropics is apt to be called a palm, whether the name is botanically appropriate or not. Thus the traveller's palm, the screw palm and the umbrella-palm are all members of quite diverse plant families. As a matter of fact, they do not even look like palm trees.

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AVIATION

New Giant Soviet Planes To Have 206-Foot Wing Span

FIRST scanty details of the design of the sixteen giant airplanes which will take the place of the ill-fated "Maxim Gorky" have been released by the Soviet Government.

The new planes will be of the all-metal monoplane type powered by six engines, each of 1,200 horsepower. The Maxim Gorky had eight engines of 850 horsepower each.

Designed to carry from 60 to 70 passengers, the new planes will have a top speed of 167 miles an hour.

The wing span of each "ship" will be 206 feet, the over-all height 36 feet, the length 111 feet and the distance between the landing wheels 34 feet.

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REPORT OF THE MISSISSIPPI VALLEY PUBLIC WORKS ADMINISTRATION—Mississippi Valley Committee—*Govt. Printing Office,* 234 p., $1.50. This is one of the most important books that has ever been printed in the United States, not so much for what it contains (though that in itself is enough to make it distinguished) as for the point of view it embodies. It proposes and outlines a New Deal of a kind which this nation must adopt, regardless of political tides, if it is to survive; which, adopted, will insure not merely continued national existence but firmly founded national greatness.

Science News Letter, September 14, 1935

Exploration

MID-ICE—Johannes Georgi—*Dutton,* 247 p., $3.75. The story, mostly in journal form, of the expedition onto the high ice plateau of Greenland, on which the late Alfred Wegener lost his life. Again the saga of impossibly heroic exertion, the endurance of unendurable hardship, the persistence in gathering scientific data in the whistling teeth of death, that Arctic exploration has supplied time after time.

Science News Letter, September 14, 1935

General Science

SCIENCE, A NEW OUTLINE—J. W. N. Sullivan—*Thomas Nelson,* 282 p., $2. A survey of science fundamental blending the newer development with older knowledge. Mr. Sullivan writes with refreshing understanding and helpful appreciation of the average person's lack of background in science. An index would make the book more useful.

Science News Letter, September 14, 1935

Geology

THE EARTH — Howard E. Brown — *Times-Journal Publishing Co., Oklahoma City, Okla.,* 449 p., cloth $2.35, special binding $2.75. Designed primarily as a textbook for high-school classes in geology, this volume can also be read with considerable pleasure by adults with no other scientific equipment than a desire to know what the earth is made of and how it is put together.

Science News Letter, September 14, 1935

Statistics—Accounting

PRACTICAL APPLICATIONS OF THE PUNCHED CARD METHOD IN COLLEGES AND UNIVERSITIES — Ed. by C. W. Baehne—*Columbia Univ. Press,* 442 p., $7.50. Billions of cards with little rectangular holes punched in them are doing service to research and record in American educational institutions. Over forty of those who have developed utilization for punched card or Hollerith technique in the registrar's office, in university business offices, in educational research, hospitals and other places where statistics are used record their experience and opinions in order that others may benefit.

Science News Letter, September 14, 1935

Medicine

ECONOMIC PROBLEMS OF MEDICINE —A. C. Christie—*Macmillan,* 241 p., $2. A vast amount has been said and written about medical economics and the cost of medical care. Many of the books are so long and so full of confusing figures and details as to be practically unreadable by the busy practicing physician or the layman. These two most interested groups should therefore welcome the present volume. Dr. Christie has succeeded in presenting the essential facts concisely and clearly. He writes from the viewpoint of a physician, but it is that of a physician whose patients' welfare is the foremost consideration.

Science News Letter, September 14, 1935

Bacteriology

AGENTS OF DISEASE AND HOST RESISTANCE—Frederick P. Gay—*Charles C. Thomas,* 1581 p., $10. A vast amount of information on the cause of disease is presented in this volume of which Dr. Gay is the principal author. Other members, past or present, of the department of bacteriology of the College of Physicians and Surgeons, Columbia University, have contributed to the book. It is intended for medical students and is designed to give them fundamental knowledge of the principles of disease causation. Diagnosis and treatment are for the most part left to subsequent studies and texts.

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Chemistry

PROCEEDINGS OF THE NINTH INTERNATIONAL CONGRESS OF PURE AND APPLIED CHEMISTRY, MADRID, APRIL 5-11, 1934, Vol. II. The papers presented are published in this volume, including one on different kinds of water by Prof. Gilbert N. Lewis of the University of California.

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General Science

THE WORK OF SCIENTISTS—Edith M. Patch and Harrison E. Howe—*Macmillan,* 488 p., plates 76c. A book for elementary school use, the chapters contributed by half-a-dozen well-known writers and scientists, under the joint editorship of a leading chemist and an experienced maker of books for younger readers. It should be highly successful, both in schools and in the hands of parents who are willing to do something on their own account toward their childrens' education.

Science News Letter, September 14, 1935

Genetics—Eugenics

HEREDITY AND THE ASCENT OF MAN — C. C. Hurst — *Macmillan,* 138 p., $1.50. Genetics and particularly recent developments in this field are presented as simply as possible considering the complexity of the subject. The lay reader should be able to get a fairly clear idea of what it is all about from reading this small volume and he will be especially interested in the author's speculations on the future of man.

Science News Letter, September 14, 1935

Physiology

THE PHYSIOLOGY OF PHYSICAL EDUCATION FOR PHYSICAL EDUCATORS AND THEIR PUPILS—Percy M. Dawson—*Williams and Wilkins,* 938 p., $8. The use of simplified spelling and many specially devised abbreviations is a unique feature of this textbook which takes a bit of getting used to but which should not impair its usefulness. Conservative educators may object to this feature and also to the informality of style, but their students will probably welcome both.

Science News Letter, September 14, 1935

Chronology

MANUAL OF THE THIRTEEN-PERIOD BUSINESS CALENDAR—*International Fixed Calendar League,* 31 p., free (When publications are free, send 10c. for handling if ordered through Science Service). How to obtain the advantages of the proposed revised calendar while the rest of the world uses the present calendar, is told. Over 700 companies in the United States and Canada are already using the thirteen-month business calendar.

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